

## REMARKS

### **A. Status of the Claims**

Claims 1-30, 32-34, 36-38, 40-41 and 43-50 remain pending in the present application. Claims 1-2, 4-7, 11-13, 23-26, 28-30, 32-34, 36-38, 40-41 and 43-46 are currently amended, claims 31, 35, 39 and 42 have been cancelled, and claims 3, 8-10, 14-22, 27 and 47-50 are original.

### **B. Claim Rejection – 35 USC § 102**

In the Office Action of October 13, 2009, claims 1-3, 11, 12, 23, 24, 27, 30-32, 39 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by *Bennett* (2,648,331).

Independent method claim 1 has been amended to read as follows:

*"1. A method of delivering combined positive and negative pressure assist ventilation to a patient, comprising:*  
*detecting neural inspiratory activation of the patient;*  
*applying a positive pressure to the patient's airways to inflate the patient's lungs;*  
*applying a negative pressure around the patient's ribcage and/or abdomen in order to reduce a load imposed by the ribcage and/or abdomen on the patient's lungs; and*  
*controlling application of the positive and negative pressures in response to the detected neural inspiratory activation of the patient.*"

In the same manner, independent system claim 23 has been amended to read as follows:

*"23. A system for delivering combined positive and negative pressure assist ventilation to a patient, comprising:*  
*a sensor of neural inspiratory activation of the patient;*

*a positive pressure ventilator connected to the patient's airways for applying a positive pressure to the patient's airways to inflate the patient's lungs;*

*a negative pressure ventilator installed on the patient's ribcage and/or abdomen for applying a negative pressure around the patient's ribcage and/or abdomen in order to reduce a load imposed by the ribcage and/or abdomen on the patient's lungs; and*

*a controller connected to the sensor of neural inspiratory activation and to the positive and negative pressure ventilators for controlling application of the positive and negative pressures in response to the neural inspiratory activation detected by the sensor.*”

Similar amendments have also been introduced in Independent system claim 30.

*Bennett* discloses the supplementation of normal respiratory action of a standard respirator by supplying intermittent positive pressure internally, so as to inflate the patient's lungs (column 1, lines 48-52). *Bennett* also describes the providing of intermittent positive pressure in proper synchronism with the standard respirator (column 2, lines 13-16). Column 4, lines 35-37 of *Bennett* finally indicates that the magnitude of both the positive and negative pressures is determined simultaneously by the positioning of a crosshead 34 upon a lever 21. The speed of driving motor 26 appears to control the frequency of the respiratory cycles.

*Bennett* therefore fails to describe detection, and a corresponding sensor of neural inspiratory activation of the patient and control, and a corresponding controller of application of the positive and negative pressures in response to the detected neural inspiratory activation.

At least for the above reasons, it is respectfully submitted that independent method claim 1 and system claims 23 and 30 describe patentable subject matter over the teaching of *Benett*.

**C. Claim Rejection – 35 USC § 103**

In the Office Action of October 13, 2009:

- Claims 4-10, 13-17, 25, 26, 28, 29, 33-38 and 41-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Bennett* (2,648,331) in view of *Sinderby* (5,820,560); and
- Claims 18-22 and 46-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Bennett* (2,648,331) in view of *Lindley* (4,481,938).

*Sinderby* describes detecting an electromyographic (EMG) signal of the patient's diaphragm to control operation of a lung ventilator, for example a positive pressure lung ventilator.

More specifically, *Sinderby* describes detecting the EMG signal to control operation of a single ventilator, in particular a positive pressure ventilator. *Sinderby* therefore fails to describe the use of such patient's neural inspiratory activation to control operation of a positive pressure ventilator and a negative pressure ventilator, and therefore to control application of positive and negative inspiratory assist pressures.

It is respectfully submitted that readily applying the teaching of *Sinderby* to that of *Bennett*, without any inventive contribution, would result in using the EMG signal to control the positive pressure assist only. Accordingly, there is no incentive to apply the teaching of *Sinderby* to control a standard negative pressure respirator as taught by *Bennett* which is supplemented with intermittent positive pressure to inflate the patient's lungs.

Applicants also respectfully submit that the combination of *Bennett* and *Sinderby* is improper. Indeed, the crosshead 34 of *Bennett* manually operated along the lever 21 through a handgrip 36 should be replaced, if at all, by another system controllable by a neural inspiratory activation signal to control the level of the positive and negative pressures. Also, the respirator of *Bennett* is designed to be used with a predetermined respiratory cycle (see claim 1, column 12, line 17 and column 1, lines 7-8) apparently controlled by the speed of the driving motor 26.

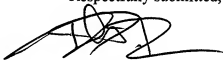
Modification of the design of *Bennett* is also required to enable a neural inspiratory activation signal to synchronize the application of the positive and negative pressures to the natural breathing of the patient. Such substantial modifications to the respirator of *Bennett* would destroy purposes and functions of that respirator, including simultaneous manual adjustment of the level of the positive and negative pressures through a mechanism including, for example, the crosshead 34, lever 21 and handgrip 36, and the predetermined respiratory cycle.

At least for the above reasons, it is respectfully submitted that the combination of *Bennett* and *Sinderby* does not render amended independent claims 1, 23 and 30 obvious.

Since the remaining dependent claims are each dependent upon one of the above independent claims, which are believed to contain patentable subject matter, these dependent claims are also believed to be allowable in the present patent application.

In view of the above comments and remarks, the Applicants respectfully request favorable reconsideration of the present application.

Respectfully submitted,



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Date: March 12, 2010